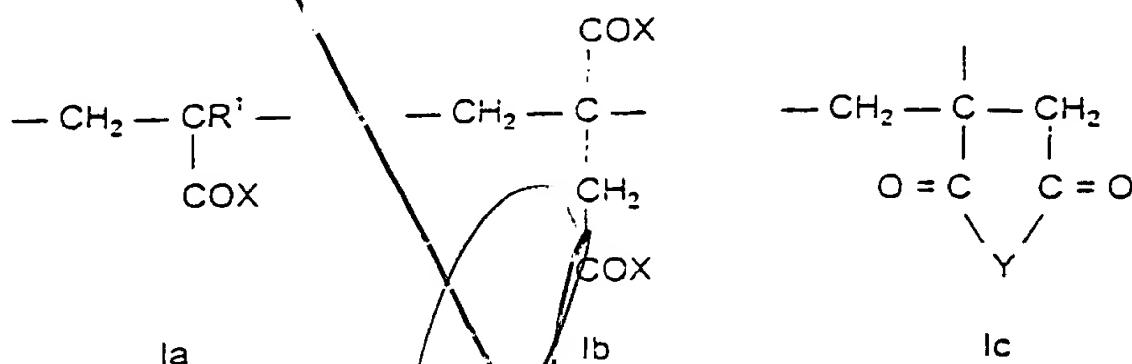


Claims

1. Copolymer based on radicals of unsaturated monocarboxylic or dicarboxylic acid derivatives and oxyalkylene glycol alkenyl ethers, characterized in that they comprise

a) from 51 to 95 mol% of structural units of the formula Ia and/or Ib and/or Ic



where R^1 = hydrogen or an aliphatic hydrocarbon radical having from 1 to 20 carbon atoms,

X = O_aM , $-O-(C_mH_{2m}O)_n-R^2$, $-NH-(C_mH_{2m}O)_n-R^2$,

M = hydrogen, a monovalent or divalent metal cation, an ammonium ion or an organic amine radical,

a = $\frac{1}{2}$ or 1,

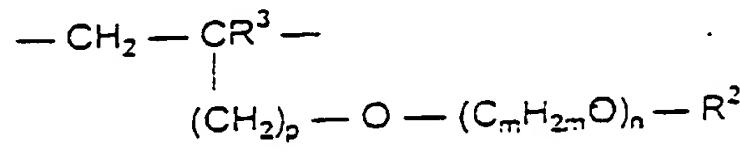
R^2 = hydrogen, an aliphatic hydrocarbon radical having from 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 8 carbon atoms, a substituted or unsubstituted aryl radical having from 6 to 14 carbon atoms,

Y = O , NR^2 ,

m = 2 to 4 and

n = 0 to 200,

b) from 1 to 48.9 mol% of structural units of the general formula II



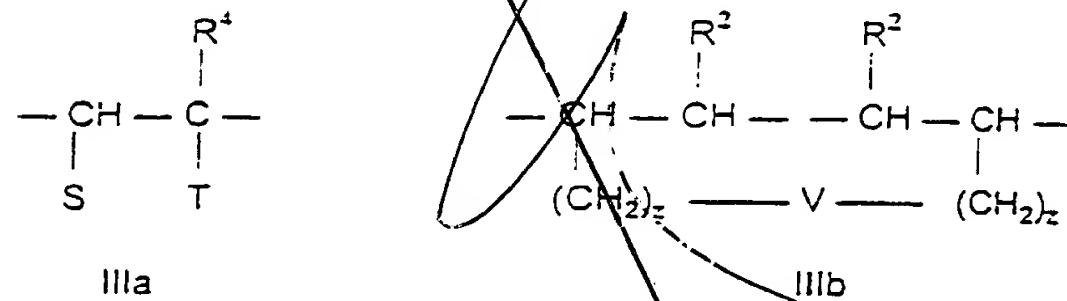
where

5 R^3 is hydrogen or an aliphatic hydrocarbon radical having from 1 to 5 carbon atoms,

p is from 0 to 3

and R^2 , m and n are as defined above,

10 c) from 0.1 to 5 mol% of structural units of the formula IIIa or IIIb

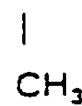


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where

$S = \text{H}, -\text{COO}_a\text{M}, -\text{COOR}^5$

$T = -U^1-\text{(CH}-\text{CH}_2\text{-O})_x-\text{(CH}_2\text{-CH}_2\text{O})_y-\text{R}^6$



20

$-\text{W-R}^7$

$-\text{CO-}[\text{NH-}(\text{CH}_2)_3]_s-\text{W-R}^7$

$-\text{CO-O-(CH}_2)_z-\text{W-R}^7$

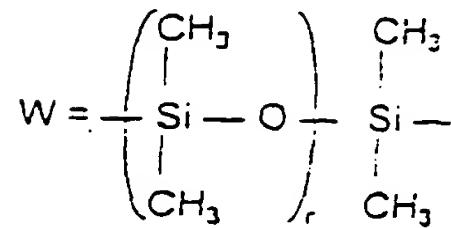
$-\text{(CH}_2)_z-\text{V-}(\text{CH}_2)_z-\text{CH=CH-R}^2$

25 $-\text{COOR}^5$ in the case of $S = -\text{COOR}^5$ or COO_aM

$U^1 = -\text{CO-NH-}, -\text{O-}, -\text{CH}_2\text{O-}$

$U^2 = -\text{NH-CO-}, -\text{O-}, -\text{OCH}_2-$

V = -O-CO-C₆H₄-CO-O- or -W-

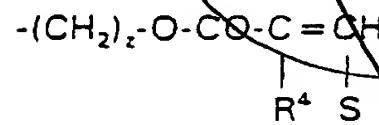
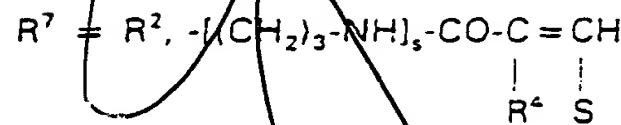
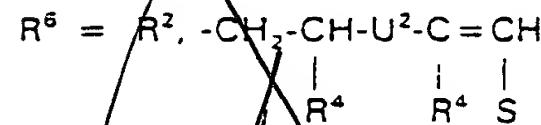


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R⁴ = H, CH₃,

10

R⁵ = an aliphatic hydrocarbon radical having from 3 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 8 carbon atoms, an aryl radical having from 6 to 14 carbon atoms,



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r = 2 to 100

s = 1, 2

z = 0 to 4

x = 1 to 150

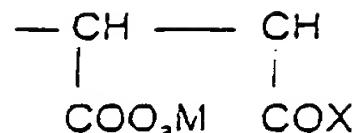
y = 0 to 15

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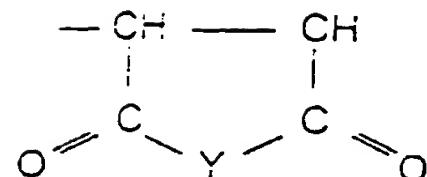
and

- d) from 0 to 47.9 mol [lacuna] of structural units of the general formula IVa and/or IVb

25



IVa



IVb

where a, M, X and Y are as defined above.

- 5 2. Copolymer according to claim 1, characterized in
that R is a methyl radical.
- 10 3. Copolymer according to claim 1 or 2, characterized
in that M is a monovalent or divalent metal cation
selected from the group consisting of sodium,
potassium, calcium and magnesium ions.
- 15 4. Copolymer according to any of claims 1 to 3,
characterized in that when R² = phenyl, the phenyl
radical is substituted by one or more hydroxyl,
carboxyl or sulfonic acid groups.
- 20 5. Copolymer according to any of claims 1 to 4,
characterized in that, in the formula II, p = 0
and m = 2.
- 25 6. Copolymer according to any of claims 1 to 5,
characterized in that it comprises from 55 to
75 mol% of structural units of the formula Ia
and/or Ib and/or Ic, from 19.5 to 39.5 mol% of
structural units of the formula II, from 0.5 to
2 mol% of structural units of the formula IIIa
and/or IIIb and from 5 to 20 mol% of structural
units of the formula IVa and/or IVb.
- 30 7. Copolymer according to any of claims 1 to 6,
characterized in that it further comprises up to
50 mol%, in particular up to 20 mol%, based on the
sum of the structural units of the formulae I, II,

III and IV, of structural units whose monomer is a vinyl or (meth)acrylic acid derivative.

8. Copolymer according to claim 7, characterized in that the additional structural units are formed from a monomeric vinyl derivative styrene, α -methylstyrene, vinyl acetate, vinyl propionate, ethylene, propylene, isobutene, n-vinyl-pyrrolidone, allylsulfonic acid, methallylsulfonic acid, vinylsulfonic acid or vinylphosphonic acid.
- 5
9. Copolymer according to claim 7, characterized in that the additional structural units are formed from a monomeric (meth)acrylic acid derivative hydroxyalkyl (meth)acrylate, acrylamide, methacrylamide, AMPS, methyl methacrylate, methyl acrylate, butyl acrylate or cyclohexyl acrylate.
- 10
- 15
10. Copolymer according to any of claims 1 to 9, characterized in that it has a mean molecular weight of from 1000 to 100,000 g/mol.
- 20
11. Process for preparing a copolymer according to any of claims 1 to 10, characterized in that from 51 to 95 mol% of an unsaturated monocarboxylic or dicarboxylic acid derivative, from 1 to 48.9 mol% of an oxyalkylene glycol alkenyl ether, from 0.1 to 5 mol% of a vinylic polyalkylene glycol, polysiloxane or ester compound and from 0 to 55 mol% of a dicarboxylic acid derivative are polymerized with the aid of a free-radical initiator.
- 25
- 30
- 35
12. Process according to claim 11, characterized in that from 55 to 75 mol% of an unsaturated monocarboxylic or dicarboxylic acid derivative, from 19.5 to 39.5 mol% of an oxyalkylene glycol alkenyl ether, from 0.5 to 2 mol% of a vinylic

polyalkylene glycol, polysiloxane or ester compound and from 5 to 20 mol% of a dicarboxylic acid derivative are used.

- 5 13. Process according to claim 11 or 12, characterized in that up to 50 mol%, in particular up to 20 mol%, based on the monomers comprising the structural units of the formulae I, II, III and IV, of a vinyl or (meth)acrylic acid derivative are additionally copolymerized.
- 10 14. Process according to any of claims 11 to 13, characterized in that the polymerization is carried out in aqueous solution at a temperature of from 20 to 100°C.
- 15 15. Process according to claim 14, characterized in that the concentration of the aqueous solution is from 30 to 50% by weight.
- 20 16. Process according to any of claims 11 to 13, characterized in that the polymerization is carried out without solvents with the aid of a free-radical initiator at temperatures of from 20 to 150°C.
- 25 17. Use of a copolymer according to any of claims 1 to 10 as an additive to aqueous suspensions based on mineral or bituminous binders, in particular cement, plaster of Paris, lime, anhydrite or other binders based on calcium sulfate or binders based on pulverulent dispersion binders.
- 30 18. Use of a copolymer as claimed in claim 17, characterized in that it is used in an amount of from 0.01 to 10% by weight, preferably from 0.1 to 5% by weight, based on the weight of the mineral binder.

Add A1